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ivers which, in connexion with it, form a continuous chain of inland navigation from the most southern parts of the empire. This city is, in fact, the emporium, and may be called the port, of Pekin. The concourse of vessels was so great for two or three miles abreast the city, that it was with difficulty the junks with the embassy on board were able to pass through them. The population was said to be 700,000, all seemingly as busy as a hive of bees.

The course of the river as far as Tiensing runs nearly east and west, and is very winding, as will be seen on reference to the chart; above Tiensing it runs nearly north and south. Near *Yung-Swin*, about 30 miles above Tiensing, the river becomes more shallow, and the tidal action ceases, from which place the junks had to be towed against the stream for the rest of the way to Tong-chou, distant by the river from Tiensing about 95 miles, or from its entrance about 180—in a direct line perhaps not more than 90 or 100 at most. The operation of towing was performed by gangs of men of fifteen or twenty for each vessel, according to its size, who ran along cheerfully, singing as they went—stout, sturdy fellows collected for the occasion. The vessels passing up the river above Tiensing seemed innumerable—chiefly with cargoes of grain and salt for Pekin.

They reached Tong-chou on the fourth day after leaving Tiensing, and shortly before arriving there, had a view of the mountain ranges of Tartary in the far distance, stretching across the horizon from east to west. So far the country on either side, as far as the eye could reach, had been one vast flat, for the most part low swampy grounds, cultivated in the vicinity of the towns and villages with rice and millet, and studded with willow-trees. The banks of the river appeared in several places to be considerably raised above the level of the adjacent lands, and great care was observable to strengthen them against breaches by any flooding of the waters. In some places sluices were noticed for letting them out for the purposes of irrigation.

Tong-chou is a very considerable city, surrounded on all sides, except that facing the river, by a high wall and ditch, the usual defences of Chinese cities. At this place, the river being no farther navigable, the embassy was landed in order to proceed to Pekin, distant about 12 miles, a fine broad and paved road leading to the capital. It may here be observed, that although there was sufficient water in August to allow the large junks to proceed so far, upon the return of the embassy early in October the river was found to have fallen so much as to be barely passable for boats for some way below Tong-chou; and in the winter it was said to be frozen, and the navigation for a time suspended in consequence.

2. *Notes on the Zambesi, from Quillimane to Tete.* From the Portuguese, by J. LYONS M'LEOD, Her Majesty's Consul for Mozambique.

AFTER leaving Quillimane, on the left hand ascending the river, we arrive at Inhasuja, which is about 2 leagues from Quillimane. Here a stream runs to the sea. On the same side of the river we next come to Interro, about $3\frac{1}{2}$ leagues farther, where there is another stream running to the sea. From this place about 4 leagues is Maenboosha; about 4 leagues more, Mangara, where there is another stream running to the sea; 3 leagues farther is Chataunga; 4 leagues onwards Mejerumba; and 6 leagues farther is Mazaro, at the Boca do Rio. A long musket-shot from Mazaro, on the same side of the river, but looking down the Luavo, is Maruro.

The tide reaches Mangara, which is about 12 or 13 leagues from Quillimane. It takes three days going from Quillimane to Mangara by water, by land one day.

Boca do Rio is dry when the Zambesi is low, but there is always plenty of water in passing Mazaro to the sea by way of Luavo.

Above Boca do Rio, on the left hand ascending the river, immediately opposite Mazaro, is Chupanga, where the Zambesi is, both during the wet and also the dry season, at least 2 miles wide.

On the right hand going up (the left bank of the river) from Boca do Rio to the Rio Chire, the land is called Magangha. The Rio Chire in the rainy season has as large a volume of water as the Zambesi; and at the Boca do Chire the Zambesi rises very high in the rainy season, and this causes the water at Mazaro to flow down to Quillimane. Even in the dry season the Rio Chire is navigable, but the stream is not so rapid as in the Zambesi. The natives ascend it in large canoes, making voyages of from twelve to twenty days to trade with a people called Magangheros. This river flows past the western flank of the Maromballa mountains (that is to say, these mountains are to the east of it), which are very high. In ascending the Zambesi, this ridge is seen first from Mangara, and it is in sight until after passing Senna.

The land on the left hand, opposite Magangha, is called Bororo: it is mountainous.

Before coming to Boca do Chire one meets with many small islands which have no names, and some of which disappear during a very wet season; but close to the Boca do Chire, and just below it, are two considerable islands, the first of which is called *Ilha Muinha*; the second, which is larger, is called *Ilha Mozambique*, and has about 300 natives living on it. *Ilha Muinha* (in Kaffir) means "Salt Island;" and on this island, at Caia and at Sone (close to Senna), the salt used in the river is made. Along both banks of the Zambesi the salt is made thus:—A portion of earth (taken up anywhere) is placed in an earthen vessel with a crack in the bottom of it; this is placed over another vessel, water is poured into the upper vessel, and the earth is moved about; the water that comes through the upper into the lower one is boiled or allowed to evaporate in the sun; the residuum is very fine salt, proving that the valley of the Zambesi was formerly the bed of the ocean.

The country in the interior opposite the mouth of the Rio Chire is called Chiringoma, from which to Sofalla is eight days' journey, and by land to Senna twelve days' journey.

After passing the Boca do Chire, and on the opposite side of the Zambesi, is Caia, where the best fish in the river abound: the fish are salted and dried in the sun; some quantity are also smoked, but the former are preferred in the native markets. From Caia to Senna is two days' walking (about 10 leagues), by water about $3\frac{1}{2}$ days (16 leagues).

After passing Caia you immediately come to Inhamudendundo, meaning, in the Maravi language, "large country." It runs along the river about 5 leagues, when one arrives at Inhamatuze, which, in the Senna language, means "dirty island," as in the rainy season it is entirely surrounded by water, and before it was brought under cultivation it was the resort of numerous animals who made their lairs there: it is one league from Senna.

Above the Boca do Chire, on the same side of the river, and nearly opposite to Inhamudendundo, is Santa Beze, in the rear of which, and all the way from the Boca do Chire, is a range of low, rocky mountains, dividing the streams of the Zambesi and Chire, the latter river running between this range and the Maromballa Mountains.

Between Senna and Tete there are numerous islands and banks, and even some rocks, and a few eddies; but when the river is in flood there is no difficulty in the way of steam navigation. In the dry season the navigation for a steamer would be doubtful. The banks of the river are well wooded with large timber. Fuel is easily procurable in great quantities.

The Zambesi, even in the dry season, is navigable from the Luavo mouth

to Cavaravassa for a vessel drawing four feet; and in the rainy season the river has at least in the shallowest part more than 12 feet, and during that season the water rises about *sixty* feet in the narrows of Lupata. As I have already stated, the tide reaches Mangara. The current is from 2 to 6 miles per hour, according to the season. The river is about 3000 yards wide at Tete; at Senna, $1\frac{1}{2}$ miles; at Quillimane, about 800 yards; at Quillimane Bar, more than 2 miles.

There are no fords. In some dry seasons there are rapids between Senna and Tete; they are not dangerous, and always passable. The bed of the river is mud, gravel, and sand.

In the dry season the water of the river is clear and transparent; in the rainy season it is brown, and at times approaching to a bright yellow. At this season the Mozambique Channel is discoloured at a distance of 80 or 100 miles from the Quillimane Bar. At Cavaravassa there is a high fall; here vessels discharge their cargoes, which are carried a quarter of a mile overland and reshipped; this operation is repeated twice before reaching Zumbo.

In the neighbourhood of Tete, gold, coal, and iron are found in close proximity. More definite information on this point, with a plan of that portion of the country, and particulars of labour, carriage, &c., I am promised by Major Sicard, Governor of Tete.

Large quantities of wheat are grown at Tete and in the surrounding country, which is considered the granary of the Zambesi: both Senna and Quillimane are annually supplied from thence. At Tete the price of wheat is about half a dollar per arroba of 32 lbs.

Opposite to Tete the country is almost overrun by the sugar-cane. The natives make sugar, but it is of an inferior quality, owing to their not understanding the manufacture of it.

The people of Tete have a great advantage over other parts of the river, for in the rear of the town, and at the foot of it, only a mile distant, is the Caruera, a high mountain, said to be from 3000 to 5000 feet in height. Here they have their plantations, consisting of different varieties of Indian or Kaffir corn, peas, beans, sweet potatoes, cabbages, onions, &c.; and close to the village is a place called Ilhalutanda, having an area of from 10 to 20 square miles, which in the rainy season is more or less flooded. When the waters retire, they plant rice, corn, wheat, beans, &c.; so that, should the plantations in the high lands fail for want of rain, they have a crop below; and, if the floods destroy the crop below, they have a supply in the mountains. In the rainy season there is generally a great fall of rain, accompanied by very high winds from the south and south-west. At times, when it is very hot, after continued calms, they have violent whirlwinds, which destroy everything in their course, breaking trees and taking up houses and whirling them in the air as if they were straw mats. Some years, in the months of June and July, they have a hot wind from the south-west, which burns up everything that may be in the ground; but this is unusual.

From Inhasuja (which is close to Quillimane) to Mazaro, and even in different parts of the river as high as Senna, the natives build their huts on stakes about 20 feet above the ground, so that in the rainy season they will not be endangered by the floods, which are constant and sudden. During this time it is not unusual for a native to indulge in the luxury of fishing out of his bed. In 1855 thousands of the natives were drowned by the river rising higher than usual; many who escaped the flood fell victims to the famine that succeeded it.

Fish of different species abound in the Zambesi. Buqueña; a long fish, long head, no scales, white, from 1 to 6 feet in length, weighing about 8 lbs., very oily, and without any small bones. Pende; from 6 to 20 inches in length, broad, scales, black, from 1 to 4 lbs. in weight; no small bones.

Muja; from 1 to 6 feet in length, from 1 to 10 lbs. in weight, long, scales, round head, sides silver, back black. Caçao; shark, called in the salt water Tubarão: similarly certain fish of this family ascend the Senegal, Amazon, and other great rivers, to the distance of several hundred miles from the ocean (vide Lyell's *Manual of Elementary Geology*, 5th edition, p. 126, and *Proceedings Geol. Soc.*, No. 43, p. 222). There are many other fish, and none poisonous.

The principal feeders or tributaries of the Zambesi are,—the Chire, between Mazaro and Senna; the Zangué, just below Senna (it is small); the Aruenha, between Massangane and Marangue; the Revubue, nearly opposite to Tete.

There are many lakes close to the river, and some of them communicate with it even in the dry season: among them may be named,—one at Caia; another in Maganja, near Santa Beze; another near Chiramba; and one in Benga, nearly opposite to Tete.

It is stated that there are no volcanoes, nor the appearance of extinct craters; and earthquakes are unheard of.

In the Caruera behind Tete there is one ferruginous spring.

For the foregoing information I am obliged to Major Tito Augusto d'Aranjo Sicard, Governor of Tete, and also to George Wilson, private in the Mozambique Company of Invalids.

3. *Explanations of the Physical Map of the Island of Madeira.* Dedicated to the Royal Geographical Society by J. M. ZIEGLER, Corres. Member.

THE impression made by the appearance of this interesting island on a traveller from the north, and especially an inhabitant of the Alps, is very striking, independently of the beautiful vegetation which covers the slopes of its mountains. There are seen deep chasms, precipices almost perpendicular, and rounded summits beside lofty needle-shaped peaks. In journeying through the island acclivities are passed which are ascended by hollows in their sides. Everywhere are encountered traces of volcanic action which, having become extinct, no longer present to the beholder columns of smoke or eruptions of cinders. But the interest of the admirer of the picturesque is not thoroughly satisfied—he sees only outlines more or less subdued. The crests and sharp peaks of the Alps are wanting, as well as the vastness of the masses composing our mountains, though the contrasts of great heights and great adjacent depths may be more remarkable. The rough-grained formation of the Vinoso (*pedra molle*, or *cantaria molle*, the building stone of the inhabitants, which they work marvellously), and the trachytic tufa resting upon it,* give not only to the rocks, but to the general appearance of the island itself, an aspect rather romantic and varied than wild and grand. Nevertheless there is probably no spot on the earth which exhibits more clearly the differences between the north and south declivities of mountains and the influence of elevation as affecting vegetation and temperature, and which would be more adapted for facilitating meteorological observations, and merits multiplied stations for such researches, and botanic gardens.

The map to which these explanations refer, in displaying the plan of the

* The most ample details will be found in the following works:—O. Heer, *Die fossilen Pflanzen de S. Jorge* (1856); by the same Author, *Naturcharakter und geologisches Alter von Madeira* (1852); Capt. Vidal, R.N., *On the Geography of Madeira*; and lastly, an important work to be published by Sir Charles Lyell and G. Hartung on the *Geology of Madeira*.